Docket No.: 0757-0316PUS1
(Patent)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application of:	Akio FUNAE et al.	**Before the Board of Appeals**	
Application No.:	10/584,414	Confirmation No.:	9411
Filed:	February 02, 2007	Art Unit:	2618
For:	MICROWAVE FREQUENCY CONVERTER	Examiner:	B. SAFAIPOUR

APPEAL BRIEF

MS APPEAL BRIEF-PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Appeal Brief is in furtherance of the Notice of Appeal filed in this case on May 28, 2010.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1206:

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APPEAL BRIEF ON BEHALF OF APPELLANT

MS APPEAL BRIEF-PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I. REAL PARTY IN INTEREST

The real party in interest for this application is the Assignee, FURUNO ELECTRIC COMPANY, LIMITED.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences that will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 6 claims pending in application.

B. Current Status of Claims

1. Claims canceled: N/A
2. Claims withdrawn from consideration but not canceled: N/A
3. Claims pending: 1-6
4. Claims allowed: N/A
5. Claims rejected: 1-6

C. Claims on Appeal

The claims on appeal are claims 1-6.

IV. STATUS OF AMENDMENTS

No amendments have been presented after the Final Rejection of November 30, 2009.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The invention of claim 1 is directed to a microwave frequency converter comprising: an RF amplifier (Fig. 1, element 21) whose gain is adjustable to any value within a range from an amplified state to an attenuated state (Page 4, lines 14 – 15; Page 10, lines 21 - 24); and a control circuit that applies a gain control voltage to the RF amplifier (Fig. 4; Page 4, line 16; Page 9, lines 9 – 22; Page 10, lines 8 – 18); wherein the control circuit controls the gain control voltage such that the gain of the RF amplifier is in the attenuated state during a period of time including a time during which a transmission section performs oscillation and times therebefore and thereafter, and to be in the amplified state during any period of time other than the period of time (Page 4, lines 17 – 21; Page 8, lines 22 – 30; Page 9 lines 1 – 4 and 23 – 29); and further wherein the RF amplifier does not perform attenuation when its gain value is associated with an amplified state (Page 8, lines 22 – 30).

The invention of claim 5 is directed to a microwave frequency converter comprising: an RF amplifier (Fig. 1, element 21) whose gain is adjustable to any value within a range from an amplified state to an attenuated state (Page 4, lines 14 – 15; Page 10, lines 21 - 24); and a control circuit that applies a gain control voltage to the RF amplifier (Fig. 4; Page 4, line 16; Page 9, lines 9 – 22; Page 10, lines 8 – 18); wherein the control circuit controls the gain control voltage

such that the gain of the RF amplifier is in the attenuated state during a period of time including a time during which a transmission section performs oscillation and times therebefore and thereafter, and to be in the amplified state during any period of time other than the period of time (Page 4, lines 17 – 21; Page 7, lines 25 – 28; Page 8, lines 22 – 30; Page 9 lines 1 – 4 and 23 – 29); and further wherein both the amplification and attenuation aspects of the amplifier gain are directly controlled by the gain control voltage (Page 7, lines 11 – 24; Page 8, lines 22 – 30; Page 10, lines 5 - 24).

The summary to the claimed invention herein is being made to comply with the Patent Office rules in submitting Briefs and is not to be considered as limiting the claimed invention.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The Final Office Action provides one (1) ground of rejection for review on appeal.

1) Claims 1 – 3 and 5 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 6,351,504 to Igarashi ("Igarashi").

VII. ARGUMENTS

The Examiner maintains, in both the Office Action of November 30, 2009 and the Advisory Action of September 30, 2010, that Igarashi's "amplifier" can be interpreted as a combination of Igarashi's automatic gain amplifier (Igarashi at Fig. 4, element 32) and the preceding attenuator (Igarashi at Fig. 4, element 31). Appellants respectfully submit that such an interpretation is inconsistent with the scope and wording of independent claims 1 and 5.

Claim 1

Independent claim 1 requires an RF amplifier with a gain setting that allows for signal amplification or signal attenuation, and a control circuit that provides a gain control voltage to the RF amplifier. The arrangement, according to claim 1, is configured such that "the control circuit controls the gain control voltage" and "wherein the RF amplifier does not perform attenuation when its gain value is associated with an amplified state."

Attenuation and Amplification Not Mutually Exclusive In Igarashi

Igarashi teaches a frequency converter that includes an attenuator (Igarashi Fig. 4, element 31) and an automatic gain high-frequency amplifier (Igarashi Fig. 4, element 32). While Igarashi's amplifier receives a control voltage from a control voltage generator (Igarashi Fig. 4, element 40), the attenuator does not. Igarashi's amplifier may therefore be seen as analogous to the "RF amplifier" of independent claim 1 whereas the attenuator, because it does not receive a control voltage signal, cannot properly be interpreted or construed as analogous to the "RF amplifier" of independent claim 1. Furthermore, the Examiner admits that Igarashi's attenuator always performs attenuation, regardless of the amplification state of the amplifier (Igarashi at Col. 3, lines 20 – 25; Page 2 of Advisory Action). An interpretation of an RF amplifier that includes both Igarashi's amplifier and Igarashi's attenuator would therefore always perform signal attenuation regardless of whether the RF amplifier's "gain value is associated with an amplified state." Such an interpretation is inconsistent with an RF amplifier that "does not perform attenuation when its gain value is associated with an amplified state" as required by independent claim 1.

Attenuation Followed By Amplification Is Not The Same As No Attenuation

Appellants note that the effects on a signal of attenuation followed by amplification are vastly different than doing nothing, or even of only performing attenuation. As is well understood in the art, signal attenuation reduces the signal-to-noise ratio (SNR) of the attenuated signal. Amplifying an attenuated signal therefore amplifies SNR-reduced signal, thereby also amplifying the noise. An amplifier that "does not perform attenuation when its gain value is associated with an amplified state" is therefore an amplifier that does not reduce the SNR of a signal when only signal amplification is required.

Igarashi Always Attenuates

As the Examiner admits in the Advisory Action, the system depicted in Igarashi's Fig. 4 always performs signal attenuation prior to signal amplification. (Igarashi at Col. 3, lines 20 – 25; Page 2 of Advisory Action) Igarashi therefore cannot be understood as teaching an "RF amplifier [that] does not perform attenuation when its gain value is associated with an amplified state" as required by independent claim 1 unless Igarashi's amplifier is considered separately

from the attenuator. Considering the amplifier separately from the attenuator, however, removes any and all attenuation capability from the amplifier.

Summary

Appellants therefore respectfully submit that there is no interpretation of Igarashi which simultaneously satisfies all the limitations of independent claim 1. At least in view of the foregoing, Appellants respectfully submit that Igrarashi is deficient in its teaching with respect to independent claim 1 and further submit that the Examiner is incorrectly interpreting the teachings thereof.

Claim 5

Independent claim 5 pertains to a microwave frequency converter that includes, in pertinent part, "an RF amplifier whose gain is adjustable to any value within a range from an amplified state to an attenuated state; and a control circuit that applies a gain control voltage to the RF amplifier ... wherein both the amplification and attenuation aspects of the amplifier gain are directly controlled by the gain control voltage."

The Examiner maintains, in the Advisory Action of September 30, 2010, that Igarashi teaches a configuration "wherein both the amplification and attenuation aspects of the amplifier gain are directly controlled by the gain control voltage" as required by independent claim 5. The Examiner's basis for this position is that since Igarashi shows a control voltage generator (Igarashi Fig. 4, element 40) directly connected to the amplifier, and since Igarashi's reception signal is attenuated by the attenuator before being amplified by the amplifier (Igarashi at Col. 3, lines 20 – 25), the net effect of controlling amplifier gain is control over attenuation level. Appellants respectfully disagree.

Igarashi's Gain Control Voltage Does Not Directly Control Attenuation Gain

Appellants respectfully submit that the Examiner appears to conflate the net effect on the signal and the state of a particular system component. Regardless of the overall effect on a signal passing through the system depicted in Igarashi's Fig 4, the gain control voltage controls only Igarashi's amplifier and does not directly control or otherwise adjust the attenuator. As can

be clearly seen in Igarashi's Fig. 4, there is no control signal going from the voltage control generator to the attenuator. Igarashi's control voltage controls only the amplifier, and Igarashi's amplifier has no signal attenuation capabilities. The Examiner states, in the Advisory Action, that the attenuator and the control voltage generator are both connected to separate terminals of Igarashi's amplifier. The Examiner concludes that the control voltage directly controls an "attenuation aspect of the amplifier gain" as required by independent claim 5 because the gain control voltage inherently accounts for the effect of the attenuator. (Page 2 of Advisory Action) Appellants respectfully submit that this is the precise definition of indirect control. Instead of controlling a signal attenuation level by changing or otherwise adjusting the degree of signal attenuation, Igarashi's gain control voltage changes the level of post-attenuation signal amplification to adjust for excess amounts of signal attenuation. Appellants respectfully submit that it is readily apparent that Igarashi can only indirectly control the attenuation aspect of the system in Igarashi's Fig. 4 since there is no direct signal path from the gain control voltage to the attenuator that would permit direct adjustment of an attenuation level instead of indirectly adjusting amplifier gain to compensate for a fixed attenuation level.

Igarashi therefore cannot possibly teach or suggest "an RF amplifier whose gain is adjustable to any value within a range from an amplified state to an attenuated state; and a control circuit that applies a gain control voltage to the RF amplifier ... wherein both the amplification and attenuation aspects of the amplifier gain are directly controlled by the gain control voltage" as required by independent claim 5 because it teaches the precise opposite.

VIII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A.

IX. EVIDENCE

There is no additional evidence pursuant to §§ 1.130, 1.131, or 1.132 and/or evidence entered by or relied upon by the examiner that is relevant to this appeal as noted in Appendix B.

X. RELATED PROCEEDINGS

No related proceedings are referenced in II. above, and thus, copies of decisions in related proceedings are not provided.

XI. CONCLUSION

The withdrawal of the outstanding rejections and the allowance of claims 1 - 6 are earnestly solicited.

If necessary, the Director is hereby authorized in this, concurrent, and future replies to charge any fees required during the pendency of the above-identified application or credit any overpayment to Deposit Account No. 02-2448.

Dated: December 27, 2010

Respectfully submitted,

By _____
Michael K. Mutter
Registration No.: 29680
BIRCH, STEWART, KOLASCH & BIRCH, LLP
8110 Gatehouse Road, Suite 100 East
P.O. Box 747
Falls Church, VA 22040-0747
703-205-8000

APPENDIX A

Claims Involved in the Appeal of Application No. 10/584,414

1. (Previously Presented) A microwave frequency converter comprising:

an RF amplifier whose gain is adjustable to any value within a range from an amplified state to an attenuated state;

and a control circuit that applies a gain control voltage to the RF amplifier;

wherein the control circuit controls the gain control voltage such that the gain of the RF amplifier is in the attenuated state during a period of time including a time during which a transmission section performs oscillation and times therebefore and thereafter, and to be in the amplified state during any period of time other than the period of time; and

further wherein the RF amplifier does not perform attenuation when its gain value is associated with an amplified state.

2. (Previously Presented) The microwave frequency converter according to claim 1, wherein the control circuit continuously changes the gain control voltage to continuously change the gain of the RF amplifier from a predetermined gain value in the amplified state to a predetermined gain value in the attenuated state, or from a predetermined gain value in the attenuated state to a predetermined gain value in the amplified state.

3. (Previously Presented) The microwave frequency converter according to claim 1, wherein the control circuit instantaneously changes the gain control voltage to instantaneously change the gain of the RF amplifier from a predetermined gain value in the amplified state to a predetermined gain value in the attenuated state, or from a predetermined gain value in the attenuated state to a predetermined gain value in the amplified state.

4. (Previously Presented) The microwave frequency converter according to claim 3, wherein the RF amplifier includes a FET device or a HEMT device operated by applying a negative voltage to a gate thereof and a positive voltage to a drain thereof, and the control circuit simultaneously switches ON/OFF the gate and drain voltages such that the gain of

the RF amplifier is in the attenuated state when the gate voltage and the drain voltage are switched ON, and in the amplified state when the gate voltage and the drain voltage are switched OFF.

5. (Previously Presented) A microwave frequency converter comprising:

an RF amplifier whose gain is adjustable to any value within a range from an amplified state to an attenuated state;

and a control circuit that applies a gain control voltage to the RF amplifier;

wherein the control circuit controls the gain control voltage such that the gain of the RF amplifier is in the attenuated state during a period of time including a time during which a transmission section performs oscillation and times therebefore and thereafter, and to be in the amplified state during any period of time other than the period of time; and

further wherein both the amplification and attenuation aspects of the amplifier gain are directly controlled by the gain control voltage.

6. (Previously Presented) The microwave frequency converter according to claim 5, wherein the RF amplifier is a FET.

APPENDIX B

There is no additional evidence pursuant to §§ 1.130, 1.131, or 1.132 and/or evidence entered by or relied upon by the examiner that is relevant to this appeal.

APPENDIX C

There are no related proceedings.